Claims

We claim:

1. A transmission system, comprising:

a plurality of receivers, each of the plurality of receivers receiving signals from one of a plurality of transmission bands; and

a cross-channel interference canceller coupled to the plurality of receivers.

2. The system of Claim 1, wherein at least one of the plurality of receivers comprises:

a down converter that converts an input signal from the one of the plurality of transmission bands to a base band;

a filter coupled to receive signals from the down converter, the filter substantially filtering out signals not in the base band;

an analog-to-digital converter coupled to receive signals from the filter and generate digitized signals;

an equalizer coupled to receive the digitized signals; and

a trellis decoder coupled to receive signals from the equalizer and generate recreated data, the recreated data being substantially the same data transmitted by a corresponding transmitter.

3. The system of Claim 2, wherein the down-converter creates an in-phase signal and a quadrature signal, the in-phase signal being the input signal multiplied by a cosine function at the frequency of the one of the plurality of transmission bands and the quadrature signal being the input signal multiplied by a sine function at the frequency of the one of the plurality of transmission bands.

4. The system of Claim 3, wherein the filter includes an in-phase filter filtering the in-phase signal and a quadrature filter filtering the quadrature signal.

5. The system of Claim 3, further including an offset block coupled between the down-converter and the filter, the offset block offsetting the in-phase signal and the quadrature signal such that signals output from the analog-to-digital converter averages zero.

6. The system of Claim 3, further including an amplifier coupled between the filter and the analog-to-digital converter, the amplifier amplifying an in-phase filtered signal from the in-phase filter and a quadrature filter signal from the quadrature filter such that the analog-to-digital converter is filled.

7. The system of Claim 6, wherein an in-phase gain of the amplifier and the quadrature gain of the amplifier are adaptively chosen in an automatic gain controller.

8. The system of Claim 7, wherein the automatic gain controller sets the in-phase gain and the quadrature gain based on the digitized signals from the analog to digital converters.

9. The system of Claim 8, wherein the in-phase gain and the quadrature gain are equal.

10. The system of Claim 3, wherein the analog-to-digital converter includes a first analog-to-digital converter coupled to receive signals from the in-phase filter and a second analog-to-digital converter coupled to receive signals from the quadrature filter.

11. The system of Claim 12, further including a correction circuit coupled between the analog-to-digital converter and the equalizer.

12. The system of Claim 11, wherein the correction circuit includes an adjustment to correct phases between the in-phase signal and the quadrature signal.

13. The system of Claim 12, wherein a small portion of one of the in-phase signal and the quadrature signal are added to the opposite one of the in-phase signal and the quadrature signal.

14. The system of Claim 13, wherein a second portion of the opposite one of the in-phase signal and the quadrature signal is added to the opposite one of the in-phase signal and the quadrature signal.

15. The system of Claim 14, wherein the small portion and the second portion are adaptively chosen.

16. The system of Claim 15, wherein the small portion is a function of in-phase and quadrature output signals from the correction circuit.

17. The system of Claim 16, wherein the second portion is a function of the ratio between in-phase and quadrature signals from the correction circuit.

18. The system of Claim 3, wherein a phase rotator circuit is coupled between the analog-to-digital converter and the equalizer.

19. The system of Claim 18, wherein a parameter of the phase rotator circuit is adaptively chosen.

20. The system of Claim 3, wherein an amplifier is coupled between the equalizer and the trellis decoder.

21. The system of Claim 20, wherein a quadrature correction is coupled between the amplifier and the trellis decoder.

22. The system of Claim 21, wherein an offset circuit is coupled between the quadrature correction and the trellis decoder.

23. The system of Claim 20, wherein an in-phase gain and a quadrature gain of the amplifier are adaptively chosen from error signals calculated from sliced values.

24. The system of Claim 23, wherein the sliced values are determined from input signals to the trellis decoder.

25. The system of Claim 21, wherein a parameter of the quadrature correction is adaptively chosen.

26. The system of Claim 22, wherein a parameter of the offset circuit is adaptively chosen.

27. The system of Claim 2, wherein the equalizer is a complex equalizer executing a transfer function, the transfer function having parameters $C_k^x(j)$ and $C_k^y(j)$ where j is an integer.

28. The system of Claim 2, wherein the equalizer is a complex equalizer executing a transfer function, the transfer function having parameters $C_k^{x,I}(n)$, $C_k^{y,I}(n)$, $C_k^{x,Q}(n)$ and $C_k^{y,Q}(n)$, where n is an integer indicating the clock cycle, and k is an integer indicating the channel.

29. The system of Claim 27, wherein the center parameters $C_k^x(0)$ and $C_k^y(0)$ are fixed.

30. The system of Claim 29, wherein $C_k^x(0)$ is one and $C_k^y(0)$ is zero.

31. The system of Claim 29, wherein the parameters $C_k^x(-1)$ and $C_k^y(-1)$ are fixed.

32. The system of Claim 1, wherein the cross-channel interference canceller provides transfer functions coupled between pairs of channels so that each of the plurality of channels can be corrected for cross-channel interference.

33. The system of Claim 32, wherein the transfer functions includes one or more time delays.

34. The system of Claim 32, wherein coefficients of the transfer functions are adaptively chosen.

35. The system of Claim 1, wherein an operating frequency of the plurality of receivers is adjusted to match that of a corresponding plurality of transmitters transmitting data into the transmission bands.

36. A method of transmitting data, comprising:

receiving a transmitted signal from a transmission medium into a plurality of receivers;

each of the plurality of receivers down-converting the transmission signal by a set carrier frequency; and

cancelling the cross-channel interference in each of the plurality of receivers.

37. The method of Claim 36, wherein cancelling the cross-channel interference in each of the plurality of receivers includes:

receiving equalized signals from each of the plurality of receivers; and

subtracting components of the equalized signals from each of the plurality of receivers from each of the other receivers.

38. The method of Claim 37, wherein subtracting components of the equalized signals includes providing a transfer function between each of the plurality of receivers.

39. The method of Claim 38, wherein the transfer function includes a multi-tap transfer function.

40. The method of Claim 39 wherein coefficients of the transfer function are adaptively chosen.

41. A transmission system, comprising:

means for transmitting data into multiple channels on a transmission medium, each of the multiple channels having a carrier frequency;

means for receiving data from the transmission medium;

means of down-converting data from each of the multiple channels;

means for digitizing the data from each of the multiple channels;

means for equalizing the data from each of the multiple channels to correct for intersymbol interference;

means for correcting the data from each of the multiple channels for cross-channel interference; and

means for providing recovered data based on the corrected and equalized data from each of the multiple channels.